THE CENTRAL AGRICULTURAL COMMITTEE, MADRAS.

Circular No. 20, dated 20th April 1907.

IMPROVEMENT OF COTTON.

The following article on the "Improvement of West African Cotton" appearing in the "Bulletin of the Imperial Institute" Volume IV, No. 4, is reprinted and published for general information:—

"The description of a simple, systematic process to be followed in selecting cotton seed for sowing, with a view to improving the type of cotton grown in British West Africa has been prepared by Mr. G. C. Dudgeon, Superintendent of Agriculture for the West African Colonies and Protectorates.

"Having selected a good 'native' variety to start from, there should be little difficulty in improving it. In several parts of West Africa good types of native cotton occur, but in all cases these have been found wanting in one or more particulars, which render them not altogether satisfactory, and the elimination of these unsatisfactory characteristics is one of the most important ends of the selection process to be described.

"Assuming that a small area has been planted with seed from one of these good 'native' cottons, and that it is desired to establish a better quality of cotton by improving this, the officer in charge of the experiment should, in the first instance, go through the plants when they are half-grown and pull up all which show signs of disease or imperfection. These should be burned. Next, all plants showing vigorous growth and a tendency to fruit early should be marked with stakes. Earliness in fruiting is desirable where the cotton plant is to be treated as an annual, but is less important where two seasons' crops are taken from the same plant. By raising an early-fruiting annual cotton, it is possible to break the continuity in the generations of many insect pests, and so render the cotton plants less liable to attack by such pests. Further, early ripening of the fruit gives the planter the opportunity of more thoroughly cultivating his land.

"About a week after the stakes have been put in, the officer should make a second inspection and eliminate from the marked plants all which show improper branching, insufficient buds to the branch, or any indications of disease.

"After these preliminary selections have been completed, strong healthy plants only will remain marked by stakes, and in these the more important characteristics must be looked for. At this time from 10 to 20 per cent of the plants in the field may bear stakes, and an examination of the first ripe bolls produced by these should be made for *fineness* and *strength* of the lint. If in the same inspection those which are most satisfactory in *whiteness*, *length* and *regularity*, of staple can be determined, so much the better. If not, the bolls must be inspected later for these qualities. At this stage the plants still remaining should have labels tied to them, with the following italicised words printed on them, against which the officer can make his note:—

Quality of stalk (thick, thin or medium).

Branches (number, high or low, bushy or straggly).

Earliness (date of opening of first bolls).

Colour of lint. Fineness, strength, length and regularity of staple (a cotton of uniform length is more valuable than an uneven cotton of greater maximum length). *Silkiness or lustre. Relative weight of lint to seed.*

"The last point can be decided upon as a final test, and will reduce the selection to plants which are to be used as mother-plants for the following season's further selection. The seed from the whole of these selected plants can be used, although it is sometimes desirable to leave out that taken from the bolls which ripen last.

"A complete description of the mother-plant selected as above should be recorded for reference. The order of importance of the qualities mentioned above having been decided upon, marks should be assigned to the different plants in the field, and in this way it should be easily determined which is the most desirable form of cotton to establish. Without such directions to follow, the choice between two or three plants might be difficult. For instance, one plant might give the largest yield, yet fail in some quality of lint, or it might be best in everything, with the exception of relative weight of lint to seed. It seems best to recommend that the seed from each of the selected plants should be sown in separate plots, and the values worked out later. In no circumstance should seed from plants showing variation from one another be mixed, or the object of the selection will be defeated.

"It is fair to take the production of seed from a selected plant in West Africa, after allowing for dead seeds, and late bolls, as 400 from which 300 plants will be produced under ordinary conditions. From these 300 plants selection must be made in the second year in the same way as before, the seed for replanting being taken only from that plant best approximating to requirements. The remaining seed of the second year's crop, which will be, at any rate, an improvement on the original stock, can be distributed to the more careful native farmers, but should not be used for sowing at the experiment station. Later when a good type has been

established in the experimental plantations, selection of parent forms will be reduced to the elimination of those plants which show an undesirable variation from the established form as well as those which show liability to disease or weakness. The work at this time will be so much simplified that the experimental plantation can then become a seed-producing area capable of distributing improved seed.

"The work of selection for each season should be done by the same officer on the plantation throughout that season."

Circular No. 21, *dated 2nd May* 1907.

CARAVONICA COTTON.

The following instructions regarding the cultivation of Caravonica Cotton, extracted from a memorandum kindly furnished by Mr. David Thomatis, Queensland, are circulated to all District and Branch Agricultural Associations:—

"(*a*) One pound of seed contains about 2,000 grains and suffices to plant over 2 acres at say 8 × 8 feet apart or about 700 trees per acre: here I plant 10 × 10 feet, and in one year the whole ground is covered.

"(*b*) The best soil is sandy loam, river flats, sea islands or any light soil as near sea-beach, etc. Land containing magnesia or magnesite is highly suitable, as also disintegrated slates and granite or schist.

"(*c*) Seed within your Presidency can be germinated all the year round; it should be put out on the field *in situ* and covered about ½ inch. It germinates from 8 to 12 days. The ground over seed should be kept *moist* during germination and, until the plant is strong, either by light showers or by watering. If seed is put in while showers occur, it saves the watering. Ground need not be ploughed, clean spots may be hoed where the seed should be placed. If ground is ploughed, a catch crop of maize, sweet potatoes, pulse, lentils, beans, etc., may be grown for the first six months.

"(*d*) After eight months, the trees should be about 6 feet high and give the maiden crop.

"The cropping should take place during your six driest or rainless months; the crop lasts for six months, the trees continually flowering, podding and bolling, and the picking should be repeated every fortnight from same trees. During the other six months of course of rainfall, the trees do their growing, when floods will not affect them, nor droughts during the cropping time. Every tree when fully developed should give from 8 to 15 lbs. of bolls of 50 *per cent* lint at least. Trees may be pruned like willows or mulberries just after the crop and as severely as one likes, even to the stump. Trees can be trained to *crop any six months* of the year the grower chooses, *i. e.*, in dry season according to his locality. The training consists in plucking all the blossoms that should appear during the rainy seasons. This done one year or two, the trees will understand."

Circular No. 22, *dated 1st July* 1907.

HINTS FOR AGRICULTURAL ASSOCIATIONS.

The following hints which have been prepared by Mr. M. E. Couchman, I.C.S., Director of Agriculture and Chairman of the Central Agricultural Committee, Madras, have been printed for general information:—

1. *General.*—It is recommended that Agricultural Associations should not at present devote any time or money to the introduction of new crops unless such are recommended by the Agricultural Department. The Department is experimenting with several kinds of crops and new varieties, and will recommend any which are found satisfactory as soon as they have been properly tested. In the meantime it will be glad to receive suggestions from the Associations as to what new crops should be experimented with; any defects in the existing crops should also be brought to its notice. It will also give advice regarding the introduction of new crops and the best method of cultivating them. Seeds for experimental purposes will not ordinarily be supplied by the Department unless there is a reasonable prospect of the experiment being a success. Orders for seed should be given a long time beforehand so that good seed may be carefully selected and prepared.

2. There are, however, several improvements in the cultivation of the indigenous crops which might be immediately introduced to the notice of the raiyats by the Agricultural Associations with great advantage, more especially, as they involve little additional trouble or expense. In some cases they will be cheaper than existing methods.

3. *Second wet crop.*—In some districts where there is a supply of water for nine months or more one crop only is grown. This is often due to the loss of time involved by waiting for irrigation water to prepare the seed-bed. Seed-beds can be prepared before the main irrigation supply is received either by baling water from a shallow well as the water level is usually near the surface in such lands, or by making dry seed-beds. For dry seed-beds good well-drained loamy soil should be selected and the seed sown after the land has been well prepared by manuring and ploughing in the dry. The early showers will suffice to cause the seed to germinate. The

transplanting can then be done within ten days of the receipt of the irrigation water, and the time thus gained will in many cases be sufficient to allow of a second wet crop being raised.

4. *Dry leguminous crop following a wet crop.*—If the water is not sufficient to enable a second wet crop to be grown, a leguminous crop such as horse-gram, or green-gram, cow-peas or *Narippayir* can be tried. In some districts it is the practice to broad-cast this in the standing paddy about ten days before the paddy is harvested. Better-crops can, however, be grown by ploughing the land immediately after harvest (before it has time to get too hard). On heavy black cotton soil or heavy rich loam a crop of Bengal gram may be raised after the paddy crop by dropping the grams into the furrow of a plough passed between the rows of stubble as soon after harvest as possible.

5. *Green manuring.*—In districts where the use of green manure crops is not understood, Associations might usefully undertake experiments, on a small scale at first, with Sunn-hemp and Wild Indigo. The land should be ploughed up and prepared immediately after harvesting the paddy and the crop ploughed in when about to flower. Sunn-hemp is thus used for manuring sugar-cane in the Godavari District and cow-peas, *Panippayir* and *Narikkaramani* are used for this purpose for paddy in several parts of the Presidency. The object of the experiment should be to compare the next paddy crop on a field thus treated with that on an adjacent plot cultivated in the ordinary manner, the two fields being cultivated in the same way in all other respects.

6. *Ploughing up of bare fallows.*—In many districts the raiyats understand the advantage of ploughing up the paddy fields for fallowing immediately after harvest, before the soil becomes too hard. In places where this practice is not followed, Associations might demonstrate the superiority of the next paddy crop grown on fields thus treated with that on fields left untouched. This experiment should not be tried on heavy clay soils at present.

7. In almost all districts too many seedlings are planted in each bunch. Experiments may be tried of planting single seedlings, the distance apart varying according to the richness of the soil; in poor soil the seedlings should be planted closer together than in rich. Some difficulty will be experienced at first in getting the coolies to follow this method, and it is possible that in the first year the crop will not show any marked superiority over the crops planted in the usual way. The seed from the crop, however, should be preserved for seed next year, and planted out in the same manner, when the superiority of the crop planted in this way should be apparent. The new variety "Banku" paddy is especially prolific when planted in this way.

8. *Dry crops.*—The chief defect in the cultivation of dry crops is the neglect to conserve the soil moisture by frequent stirring of the soil after rain or irrigation. On ordinary dry lands this end is to some extent obtained by the practice of ploughing through the young crop. This is a tedious and expensive method and is apt to damage the crop. On irrigated dry crops the neglect of surface cultivation necessitates more frequent waterings than would otherwise be required. By hoeing and weeding *after* irrigation instead of *before*, this would be remedied to some extent.

9. There are two simple experiments which Associations may try for the purpose of remedying these defects :—

(*a*) Crops on ordinary lands should be harrowed after every shower of rain as soon as the ground is dry enough; the crust which would otherwise harden on the surface is thus broken up, evaporation is minimised, and the surface soil is ærated. The standing crop will be little, if at all, damaged if the harrow is used with discretion. A pattern harrow can be supplied by the Central Agricultural Committee at cost price.

(*b*) Dry crops may be sown in rows with the country-drill, or dropped behind the plough, and the soil between the rows cultivated with the bullock hoe. Patterns of these instruments will be supplied at cost price by the Central Agricultural Committee to any Associations who wish to try them.

10. In irrigated garden lands the same method of cultivation may be followed. Transverse supply channels may be made only when the levels require them. Very valuable information could be collected if a careful record could be kept of the frequency with which irrigation is found necessary on lands thus treated as compared with lands the surface soil of which is left untouched. Some experiments which have lately been tried with the ground-nut on the Government Agricultural Station at Palur show that a great economy of water can be effected by loosening the soil on the day after each irrigation.

11. All possible help and advice will be given to Associations conducting experiments on these lines by the officers of the Agricultural Department, and where the experiments are on approved lines, and can be supervised by the Agricultural Department, grants-in-aid can be obtained from Government (G. O. No. 1084 of 8th May 1907).

H. E. HOUGHTON,
P. RAJARATNA MUDALIYAR,
Honorary Secretaries.